Dale Power Solutions Ltd

User Manual

E700 Series UPS

E73310B
E73315B
E73320B
E73330B
E73340B

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Safety

WARNING!

THIS EQUIPMENT MUST BE INSTALLED, COMMISSIONED AND MAINTAINED BY A QUALIFIED ELECTRICIAN.

There are dangerous voltages and high temperatures inside the UPS. During installation, operation and maintenance please abide by local safety instructions, regulations and laws. Failure to do so may result in injury to personnel or damage to equipment. Safety instructions in this manual are supplementary to local safety instructions. Dale Power Solutions plc does not accept any liability caused as a result of failure to follow safety instructions. Please note the following:

- Do not use the UPS for any other purpose than the one for which it was designed.
- Do not exceed the rated load of the UPS.
- Under no circumstances open the UPS. There are high voltages inside that can cause electric shock. If the UPS requires internal maintenance or battery replacement, contact Dale Power Solutions plc.
- Keep the UPS in a dry well ventilated location away from any area or situation in which there is a risk of fire, such as direct sunlight or other sources of heat.
- If the UPS emits smoke, turn off immediately the input circuit breaker and battery circuit breaker, and contact Dale Power Solutions plc.

WARNING!

THIS IS A PRODUCT FOR COMMERCIAL AND INDUSTRIAL APPLICATION IN THE SECOND ENVIRONMENT. INSTALLATION RESTRICTIONS OR ADDITIONAL MEASURES MAY BE NEEDED TO PREVENT DISTURBANCES (AS STATED IN EN62040-2:2006).

Warning symbols

The safety symbols used in this manual are shown in table below. They alert you to important safety information that you need to be aware of when installing, operating and maintaining the UPS.

Safety Symbol	Indication
	Attention
	Static discharge sensitive
	Electric shock

Caution: A caution describes a situation in which there is a risk of damage to equipment.

WARNING!

A WARNING DESCRIBES A SITUATION IN WHICH THERE IS A RISK OF INJURY OR DEATH TO PERSONNEL.

Conformity and standards

This equipment complies with CE directives 73/23 & 93/68 (LV Safety) and 89/336 (EMC), and the following product standards for Uninterruptible Power System (UPS):

- IEC 62040-1-1 General and safety requirements for use in operator access area
- IEC 62040-2 EMC requirements; Class C3 compliant
- IEC 62040-3 Performance requirements and test methods

Caution: Continued compliance requires installation in accordance with the instructions this manual and the use of manufacturer approved accessories only.

According to IEC62040, this is a low emission class C3 Uninterruptible Power System (UPS) product. In a residential environment, this product may nevertheless cause radio interference, in which case, you may be required to take additional measures.

Energy conservation and environmental protection

With an efficiency of greater than 97% in ECO mode the UPS meets the technical specifications for energy conservation. An input power factor of 0.99 results in minimum current contamination of the power grid. All the material and components comply with the ROSH standards, ensuring that no hazardous waste is produced.

Product description

Applications

This UPS series provides reliable AC backup power to various types of equipment, for example computer centres, network management centres, auto control systems, and telecommunication systems.

The UPS can be installed and operated as a single unit or it can be operated with other units of the same type in parallel N+1 redundant mode for additional reliability or in parallel capacity mode for increased output rating.

Product range

The following table lists the models available in the E700 series. All models are designed to operate with an internal battery.

Capacity	10 kVA	15 kVA	20 kVA	30 kVA	40kVA
Model	E73310B	E73315B	E73320B	E73330B	E73340B
Battery location	Internal				

Main Features

Summarization

The E700 series UPS is a three phase in, three phase –out, high frequency online UPS, it is available in four models: The 10KVA, 15KVA, 20KVA and 30KVA. The UPS can help with most power supply problems, such as blackouts, over-voltage, under-voltage, sudden voltage drop, oscillating of decreasing extent, high voltage pulse, voltage fluctuation, surge, inrush current, harmonic distortion (THD), noise interference, frequency fluctuation, etc..

2.2 Functions and Features

- **3Phase In/3Phase Out UPS**

  It is 3Phase In/3Phase Out high-density UPS system, of which input current is kept in balance.

- **Digital Control**

  This series UPS is controlled by Digital Signal Processor (DSP); which increases reliability, performance, self-protection, self-diagnostics and so on.

- **Battery Configurable from 32 blocks to 40 blocks**

  The battery voltage of this series UPS can be configured at 32 blocks, 34 blocks, 36 blocks, 38 blocks or 40 blocks according to your needs.

- **Charging Current is configurable**

  The user may set the capacity of the batteries as well as reasonable charging current. Constant voltage mode, constant current mode or floating mode can be switched automatically and smoothly.

- **Intelligent Charging Method**

  The series UPS adopts advanced three-stage charging method—

  1st stage: high current constant current charging

  to guarantee to charge back to 90%;

  2nd-stage: Constant Voltage

  In order to vitalize battery and make sure batteries are fully charged

  3rd stage: floating mode.

  With this 3-stage charging method, it extends the life of the batteries and guarantees fast charging.

- **LCD Display**

  LCD and LED displays, the user may easily get UPS status and its operational parameters, such as input/output voltage, frequency & load%, battery % and ambient temperature, etc..

- **Intelligent Monitoring Function**

  Via optional SNMP Card, you may remotely control and monitor the UPS.

- **EPO Function**

  The series UPS may be completely shut off when the EPO is pressed. REPO function (Remote EPO) is also available in this series UPS.

System block diagram

The UPS is connected between the mains a.c. input source and the critical load to provide uninterruptible power free from disturbances on the mains supply such as voltage and frequency variations. This is achieved using high-frequency double-conversion pulse width modulation (PWM) and full digital signal processing (DSP) control.

As shown in Figure 1, input mains is converted to d.c., which in turn feeds a d.c./d.c. battery charger and an inverter. The inverter then converts the battery voltage to a clean a.c. source, output-independent of the input. The battery powers the load through the inverter in case of an input mains power failure.

If the inverter is unable to supply power for any reason the load is supplied via the bypass circuit, which includes the bypass input breaker and the static transfer switch (STS).

If maintenance or repair is necessary the UPS can supply the load via the internal and manually controlled maintenance bypass breaker. With the exception of the maintenance bypass breakers (internal and external) all the breakers shown are closed during normal UPS operation.

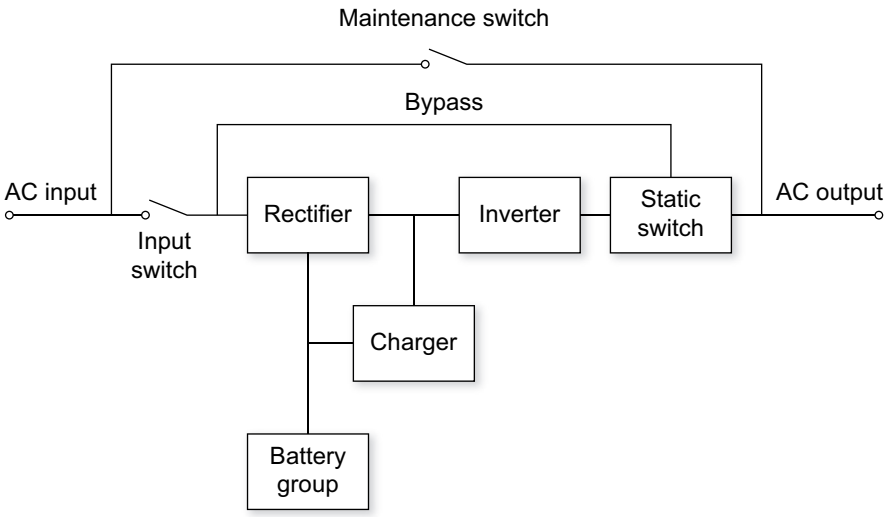


Figure 1 Single unit block diagram

An external bypass breaker enables a UPS to be replaced without interrupting the load and is recommended in most installations.

Static transfer switch

The static transfer switch (STS) is a power-electronic circuit. During normal operation the load is supplied via the inverter, however in the event of a UPS overload or inverter failure, the STS transfers the load automatically to the bypass circuit. To provide a clean (no-break) load transfer between the inverter output and bypass line, the inverter output is synchronized to the bypass supply during normal operating conditions.

Multi-unit operation

Up to four units can be operated in N+X parallel mode to provide additional power or higher reliability. In this configuration the load is shared equally between the units.

It is also possible to operate with load bus synchronisation (LBS), which allows the load to be transferred seamlessly between two UPS systems. Each system can be a single UPS or a parallel group of units.

Multi-unit operation is enabled by:

- Hardware and firmware built into each UPS, controlled by software settings.
- Parallel control cables, connected in a ring to enhance reliability. Dual-bus control cables are connected between any two UPS modules of each bus. The intelligent paralleling logic provides the user with maximum flexibility. For example, shutting down or starting up UPS units in a parallel system can be done in any sequence. Transfers between **Normal** and **Bypass** modes of operation are synchronised and self-recovering.

The total load of a multi-unit system can be queried from each unit's LCD display.

Installation

Siting considerations

Before unpacking and installing the unit, consider the following:

- DONOT expose the UPS to high temperatures, water ingress, flammable or corrosive gas, dust, direct sunlight or explosives.
- Locate the UPS indoors on a level surface as close as possible to the equipment it will be powering to minimise cable voltage drops. If required, allow enough spare cable to move the UPS after installation.
- Maintain a gap of at least 50 cm from walls or other equipment, and ensure the ventilation holes/slots at the front and rear of the units are not obstructed.
- For improved product reliability ensure cool air is available at the front of the unit.
- The environment temperature around UPS should keep in a range of 0℃~40℃. If the environment temperature exceeds 40℃, the rated load capacity should be reduced by 12% per 5℃. The max temperature can't be higher than 50℃, also as an approximation, battery life is halved for every 10K (10℃) rise in temperature.
- The highest altitude that UPS may work normally with full load is 1500 meters. The load capacity should be reduced when this UPS is installed in place whose altitude is higher than 1500 meters, shown as the following table:

（Load coefficient equals max load in high altitude place divided by nominal power of the UPS）

Altitude (m）	1500	2000	2500	3000	3500	4000	4500	5000
Load coefficient	100%	95%	90%	85%	80%	75%	70%	65%

The UPS cooling is depending on fan, so it should be kept in good air ventilation area. There are many ventilation holes on the front and rear, so they should not be blocked by any exotic obstacles.

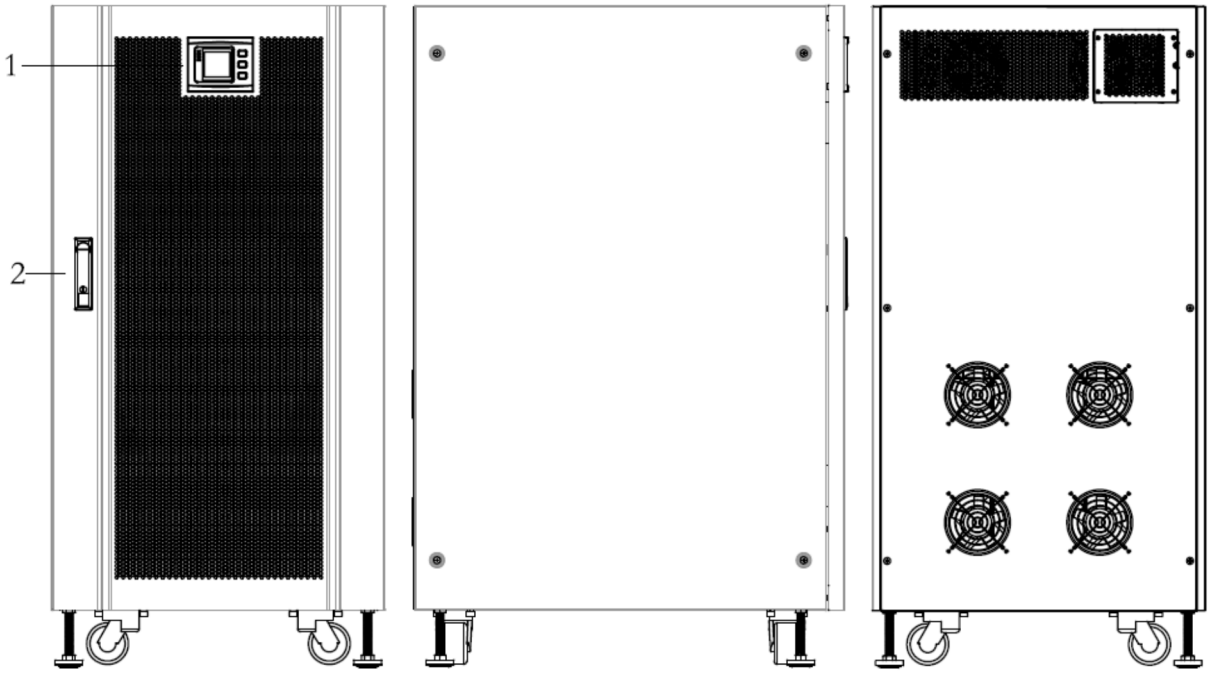
Unpack checking

1. Don't lean the UPS when moving it out from the packaging

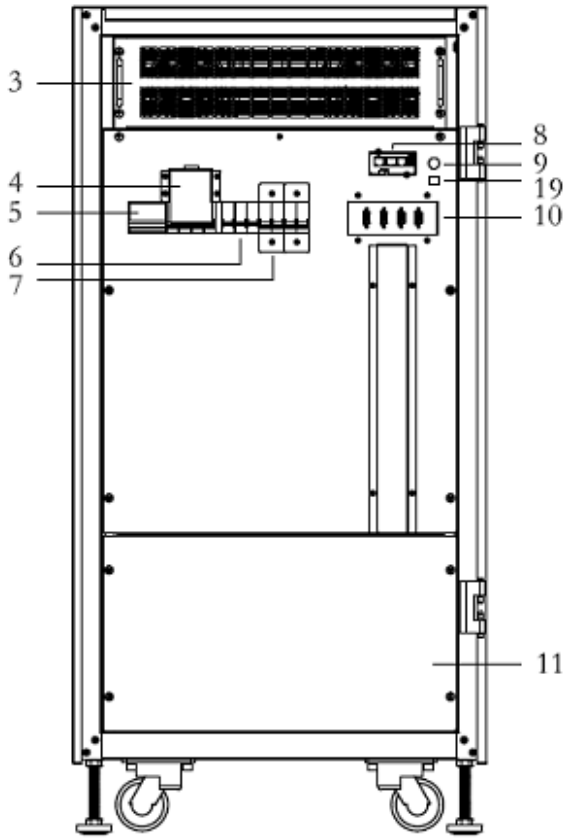
2. Check the appearance to see if the UPS is damaged or not during the transportation, do not switch on the UPS if any damage found. Please contact the dealer right away.

The appearance of the product

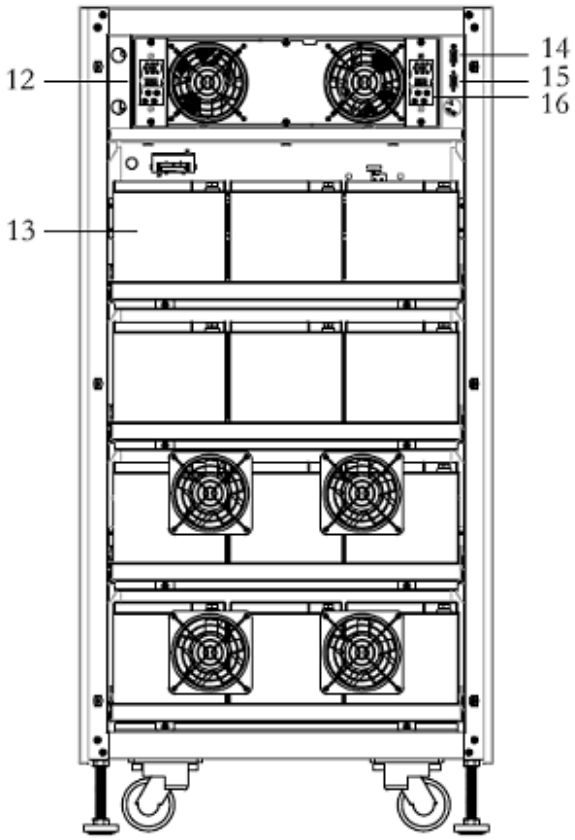
1. 10/15/20KVA



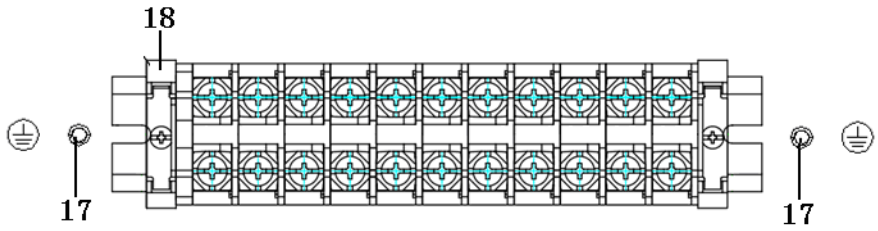
Front View **Side View** **Rear View**



Front View（internal）



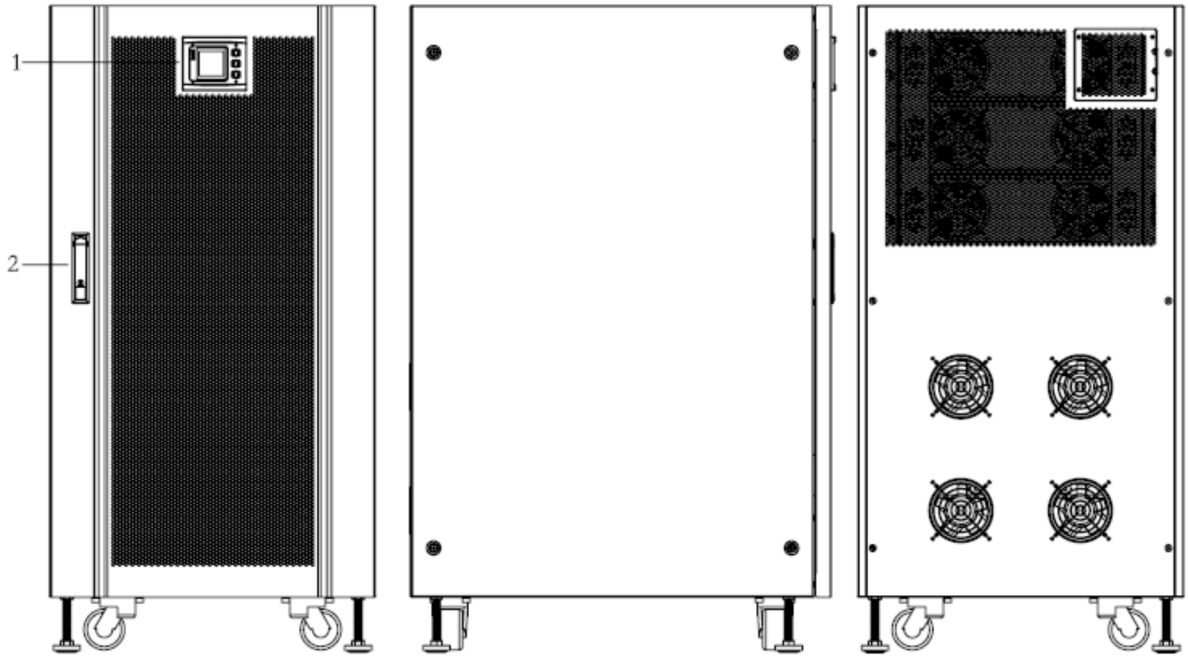
Rear View（internal）



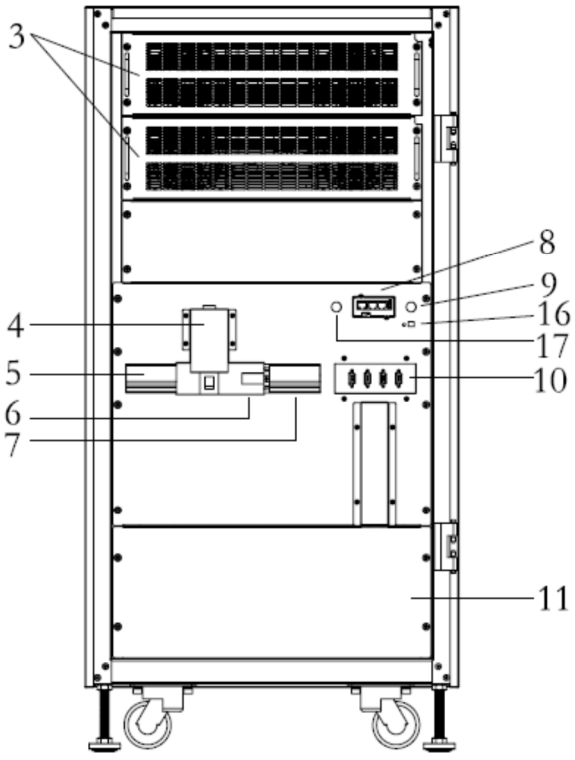
Terminal Block（terminal block without cover）

(1) LCD panel	(2) Front lock	(3) UPS Module	(4) Maintenance switch & its cover
(5) I/P Switch	(6) O/P Switch	(7) Battery Switch	(8) Intelligent slot（SNMP card/Relay card）
(9) EPO switch	(10) Communication port	(11) Terminal Block cover	(12) Input connector slot of UPS Module
(13) Battery	(14) Parallel port 1	(15) Parallel port 2	(16) Output connector slot of UPS Module
(17) GND	(18) Terminal block for Input, output & battery		(19) REPO

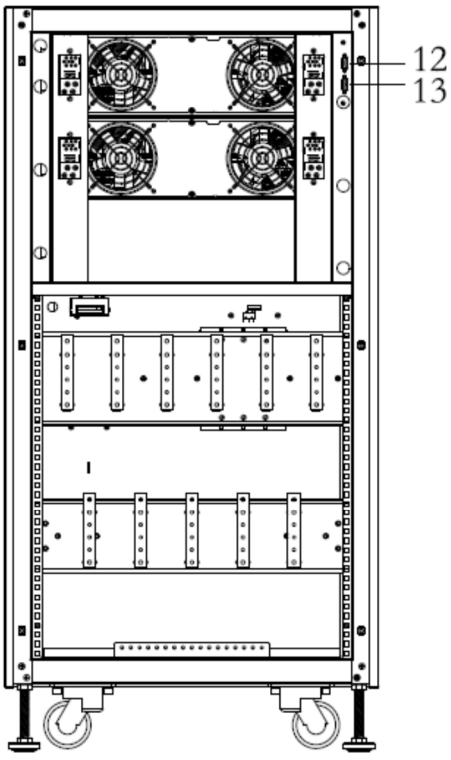
2. 30-40KVA



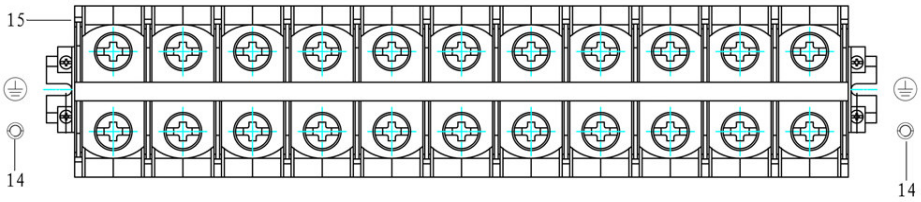
Front View **Side View** **Rear View**



30-40KVA front view（internal）

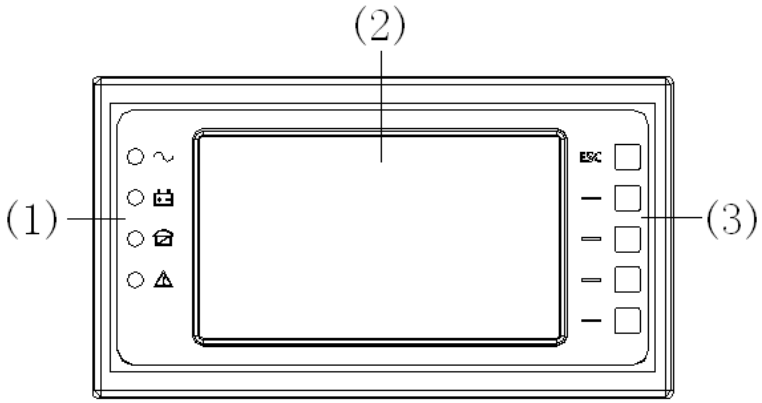


30-40KVA rear view（internal）



(1) LCD panel	(2) Front lock	(3) UPS Module	(4) Maintenance switch & its cover
(5) I/P Switch	(6) Maintenance switch	(7) O/P Switch	(8) Intelligent slot（SNMP card/Relay card）
(9) EPO switch	(10) Communication port	(11) Terminal Block cover	(12) Parallel port 1
(13) Parallel port 2	(14) GND	(15) Terminal block for Input, output & battery	
(16) REPO	(17) Cold start button		

LCD control panel



LCD control panel introduction

（1）LED（from top to bottom: “mains output”, “bypass output”、“battery output”、“alarm”）

（2）LCD display

（3）Function buttons

CAUTION!

An unused battery must be recharged every 6months Temporarily connecting the UPS to a suitable AC supply mains and activating it for the time required for recharging the batteries.

External Protective Devices

For safety reasons, it is necessary to install, external circuit breaker at the input A.C. supply and the battery. This chapter provides guidelines for qualified installers that must have the knowledge of local wiring practices for the equipment to be installed.

- **External Battery**

The UPS and its associated batteries are protected against the effect of over-current through a DC compatible thermo-magnetic circuit-breaker (or a set of fuses) located close to the battery.

- **UPS Output**

Any external distribution board used for load distribution shall be fitted with protective devices that may avoid the risk of UPS overloaded.

- **Over-current**

Protection device shall be installed at the distribution panel of the incoming main supply. It may identify the power cables current capacity as well as the overload capacity of the system .

CAUTION !

Select a thermo magnetic circuit-breaker with an IEC 60947-2 trip curve C (normal) for 125% of the current as listed below.

Cable sizes

Use the following sizes of cables to connect the UPS between mains power, batteries and the load.

WARNING !

Upon starting, please ensure that you are aware of the location and operation of the external isolators which are connected to the ups input/bypass supply of the mains distribution panel. Check to see if these supplies are electrically isolated, and post any necessary warning signs to prevent any inadvertent operation

- For future expansion purpose, it is economical to install power cable according to the full rating capacity initially. The diameter of cable is shown bellow:

UPS cabinet	Cable Dimension			
	AC Input (mm^2)	AC Output (mm^2)	DC Input (mm^2)	Ground (mm^2)
10kVA	10	10	10	10
15kVA	16	16	16	16
20kVA	25	25	25	25
30kVA	25	25	25	25
40kVA	35	35	35	35

CAUTION!

Protective earth cable: Connect each cabinet to the main site earth system. For best connection, follow the shortest route possible.

WARNING!

Failure to follow adequate earthing procedures may result in electromagnetic interference or hazards involving electric shock and fire

Power cable connect

Before connecting the UPS, read the siting considerations above and check you have selected breakers and cables with the correct ratings.

WARNING!

BEFORE ATTEMPTING TO WIRE THE UPS ENSURE ALL BREAKERS ARE IN THE OFF POSITION AND WHERE POSSIBLE LOCKED OFF.

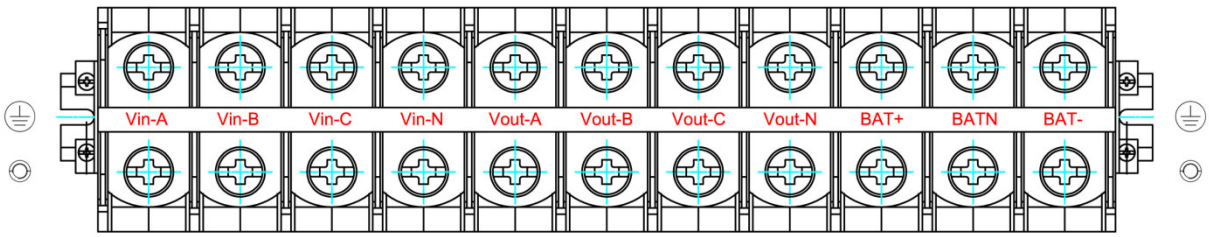
Caution: DO NOT mix batteries from different manufacturers or mix different types of batteries. DO NOT use old and new batteries together.

Caution: Ensure correct phase rotation in the 3-phase wiring.

Once the equipment has been finally positioned and secured, connect the power cables as described in the following procedure.

Verify the UPS is totally isolated from its external power source and also all circuit breakers on the UPS are open. Check to see if they are electrically isolated, and post any necessary warning signs to prevent their inadvertent operation.

Open the UPS lower front panel; remove the cover of terminals for wiring.



Terminal sequence from left to right: Input phase A(L1), input phase B(L2), input phase C(L3), input Neutral line, output phase A(L1), output phase B(L2), output phase C(L3), output Neutral line, battery positive, battery Neutral, battery negative. Next to the terminal block's left & right ends are several connections for earth.

Choose appropriate power cable.（Refer to the table above）and pay attention to the diameter of the connection terminal of the cable that should be the correct size for the connection poles;

WARNING!

If the load equipment is not ready to accept power on the arrival of the commissioning engineer then ensure that the system output cables are safely isolated at their ends

Connect the safety earth and any necessary bonding earth cables to the copper earth screw located on the floor of the equipment below the power connections. All cabinets in the UPS must be grounded properly.

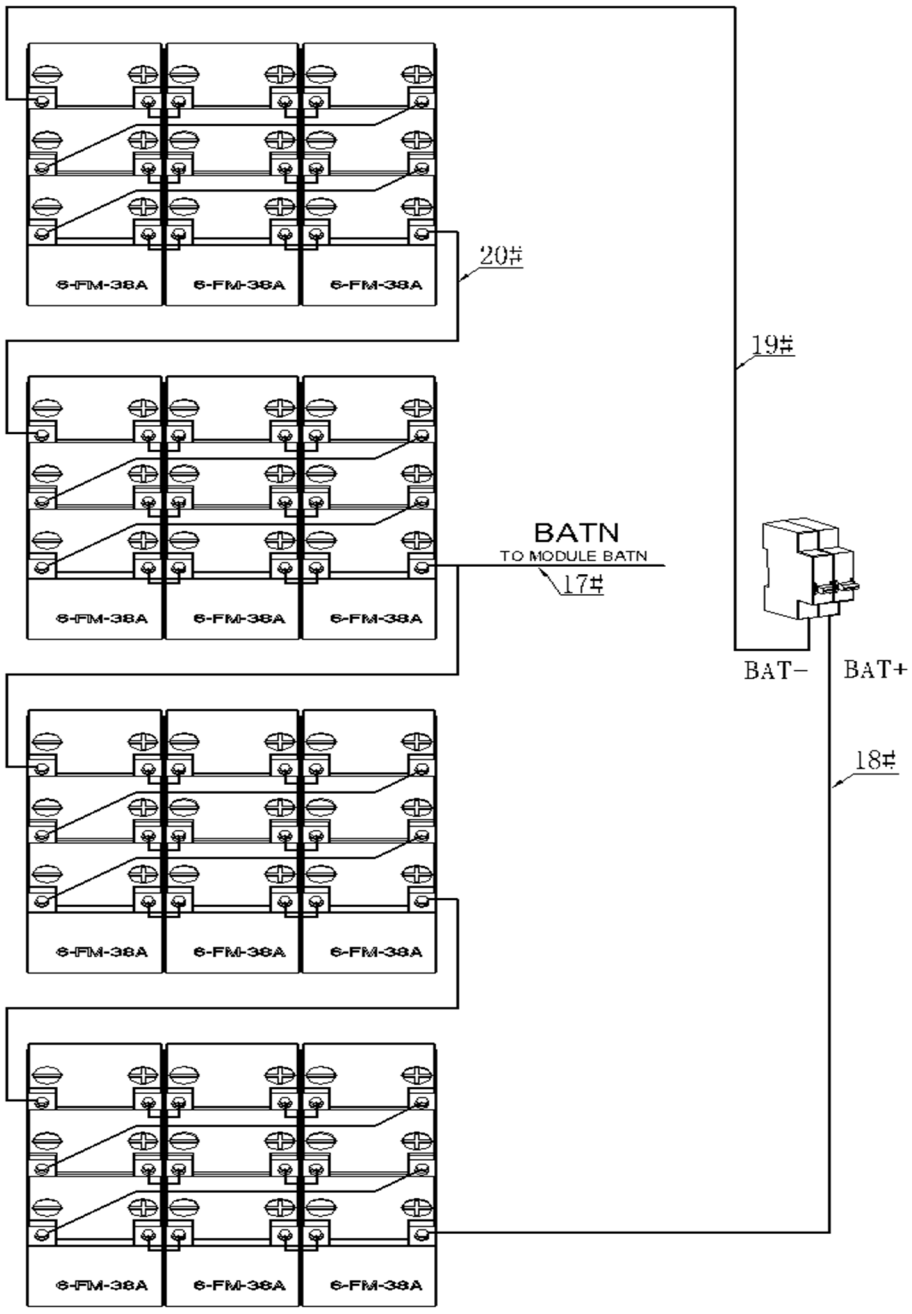
CAUTION!

The earthing and neutral bonding arrangement must be in accordance with local and national codes of practice.

Battery connection

The UPS uses a centre tapped battery system, this give a positive and negative battery values, typically giving a total of 36 blocs (optional 32/34/38/40) in series. A neutral cable is retrieved from the joint between the cathode of the 18th (16th/17 th/19th/20 th) and the anode of the 19th (17th/18 th/20th/21 th) of the batteries. Then the neutral cable, the battery Positive and the battery negative are connected with the UPS respectively. The battery sets between the Battery anode and the neutral are called positive batteries and that between neutral and cathode are called negative ones. The user can choose the capacity and the numbers of the batteries according to their desire.

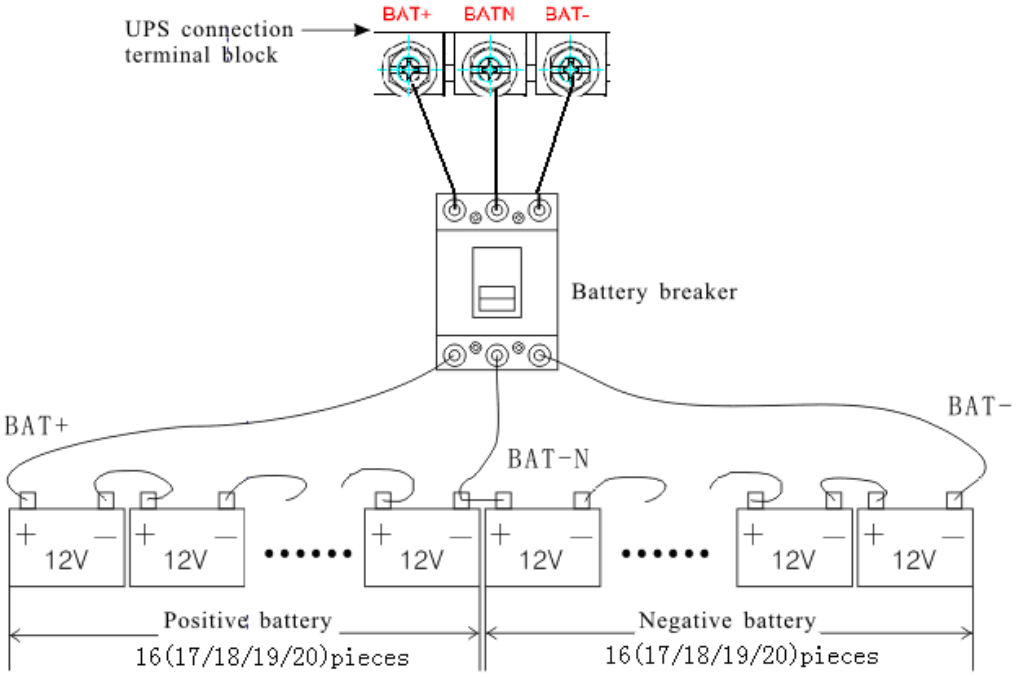
Internal battery connection in standard unit:



Note：The BAT+ of the UPS connect poles is connected to the anode of the positive battery, the BAT-N is connected to the cathode of the positive battery and the anode of the negative battery, the BAT- is

connected to the cathode of the negative battery. Factory setting of the standard unit is battery quantity---36pcs, battery capacity---12V38AH.

External battery connections.



Note：

The BAT+ of the UPS connect poles is connected to the anode of the positive battery, the BAT-N is connected to the cathode of the positive battery and the anode of the negative battery, the BAT- is connected to the cathode of the negative battery.

CAUTION!

Ensure correct polarity battery string series connection. i.e. inter-tier and inter block connections are from (+) to (-)terminals.

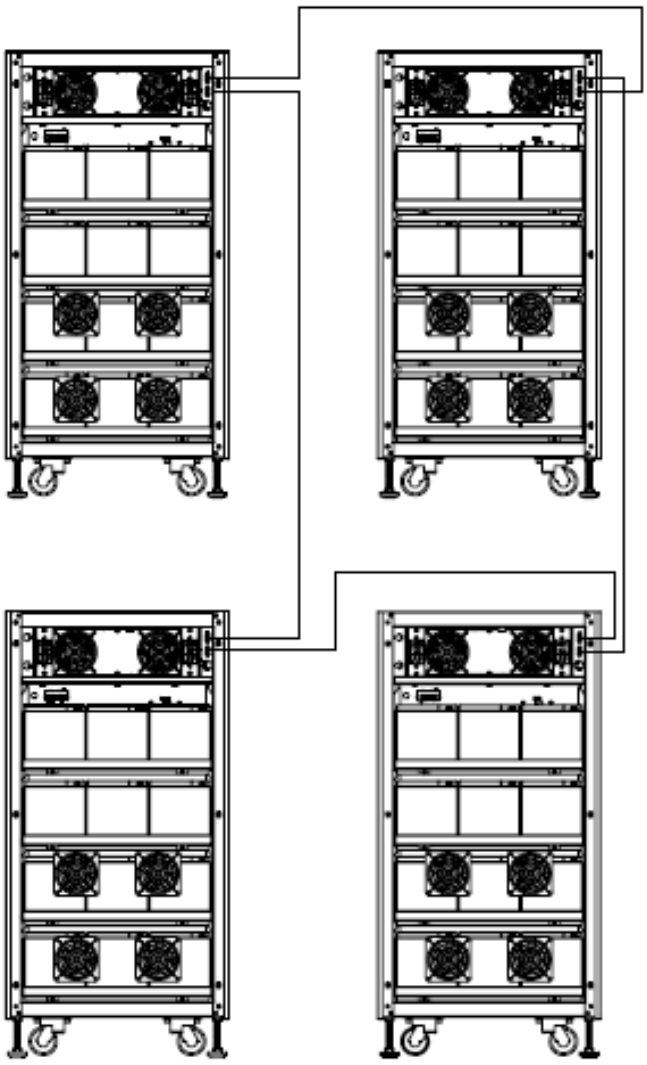
Don't mix batteries with different capacity or different brands, or even mix up new and old batteries.

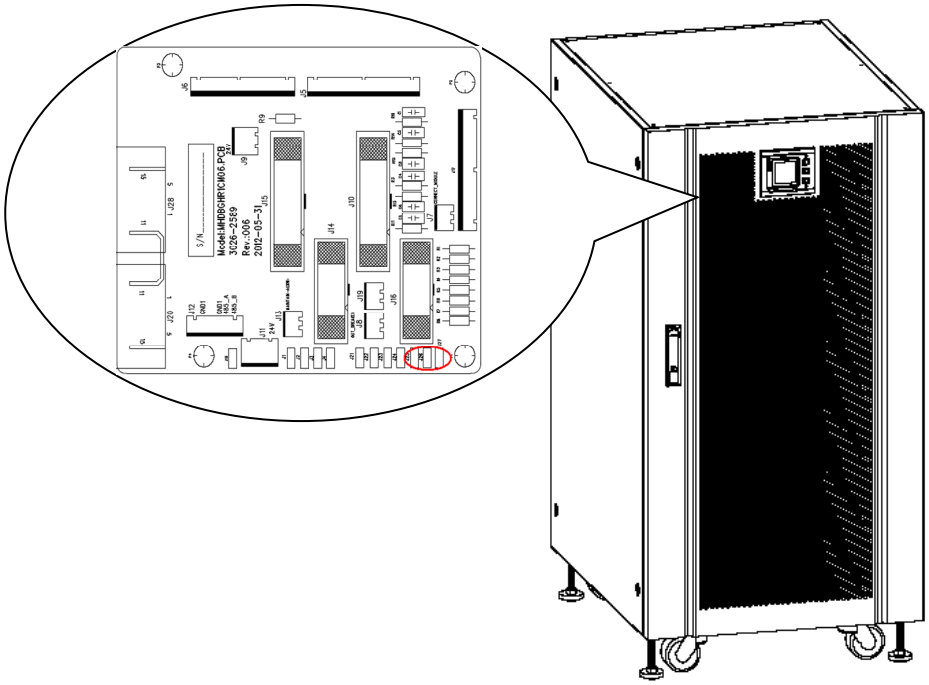
WARNING!

Ensure correct polarity of string end connections to the Battery Circuit Breaker and from the Battery Circuit Breaker to the UPS terminals i.e. (+) to (+) / (-) to (-) but disconnect one or more battery cell links in each tier. Do not reconnect these links and do not close the battery circuit breaker unless authorized by the commissioning engineer.

UPS Multi－Module Installation

The basic installation procedure of a parallel system comprising of two or more UPS modules is the same as that of single module system. The following sections introduce the installation procedures specified to the parallel system.





With the 30 kVA units working in parallel you need to set jumper links on the parallel card (MHDBGHR1CM06), this is located behind the left hand side panel of the UPS, as shown above.

For 3 units in parallel please remove jumpers J26 and J27 on all 3 units in the system.

For 4 units in parallel please remove jumpers J25, J26 and J27 on all 4 units in the system.

No jumper links need to be altered for 2 units in parallel or for the 10, 15 or 20 kVA models.

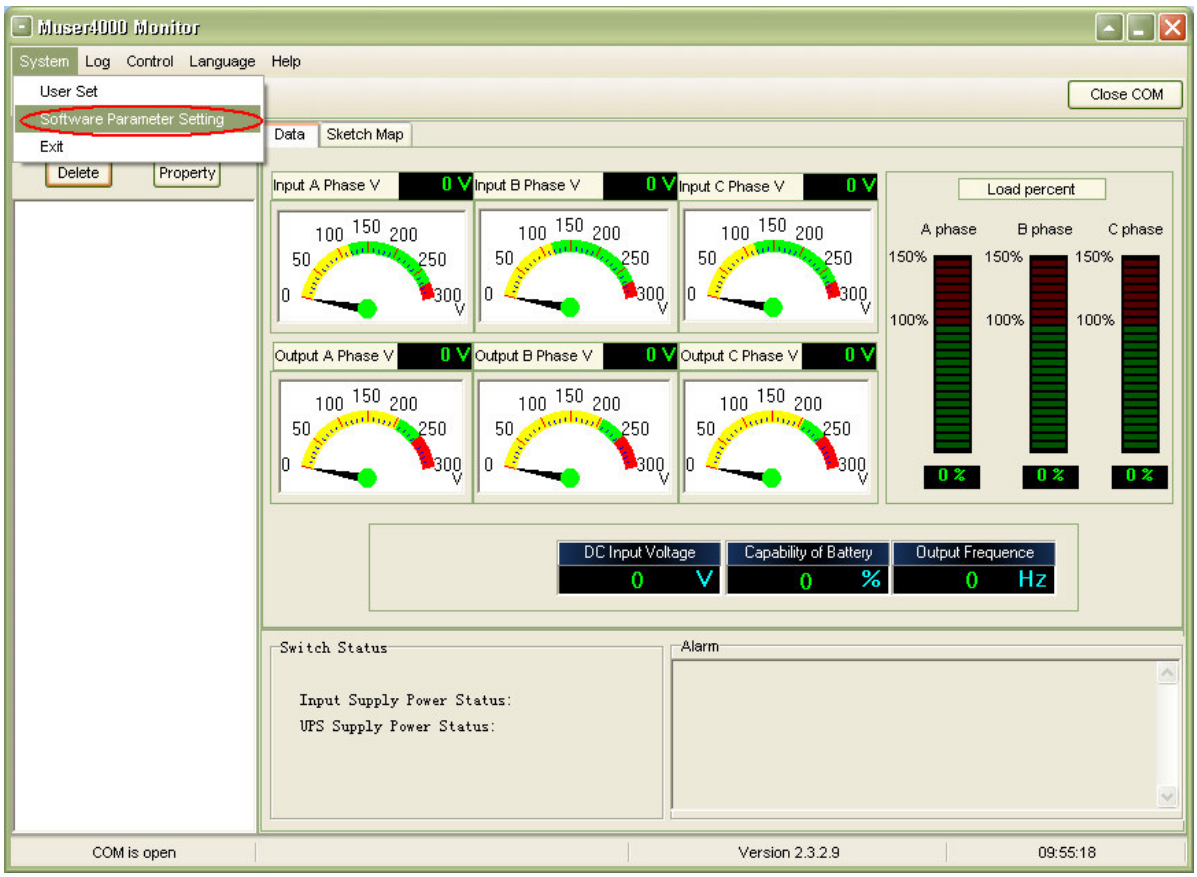
Requirement for the parallel system

A group of paralleled units behave as one large UPS system but with the advantage of presenting higher reliability. In order to assure that all modules are equally utilized and comply with relevant wiring rules, please follow the requirements below:

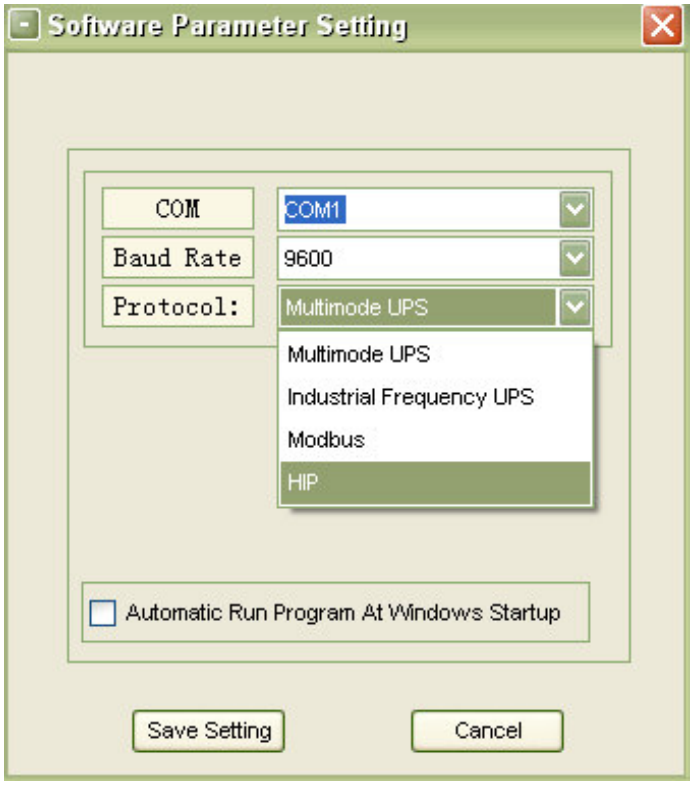
1. All UPS modules must be of the same rating and be connected to the same source.
2. The outputs of all the UPS modules must be connected to a common output bus.
3. The length and specification of power cables including the bypass input cables and the UPS output cables should be the same. This facilitates load sharing when operating in bypass mode.

Computer access

- One end of a RS232 communication cable connect to the computer, the other end connect to the RS232 port on the UPS.
- Open the software Muser4000, click “system” button.

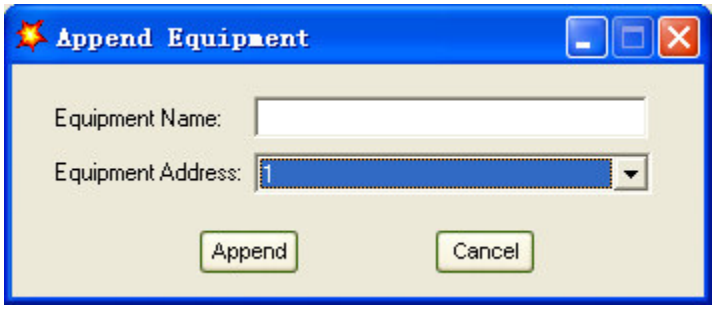


- A window of “Software Parameter Setting” comes out as below, COM choose according to the UPS , baud rate choose 9600, protocol choose “HIP”, then save this setting.



- On the main page of Muser4000, click the button of “Append”, then goes to a window of “Append equipment”.

- Put the UPS name into “Equipment Name”, and UPS’ ID address into “Equipment address”.



- Click the button “Append”, then the connection between UPS & computer is accomplished.

Note：

When powered by inverter, it is necessary to turn off the inverter before setting the voltage and frequency level in PC.

Operation

Working modes

The UPS has the following modes of operation:

- On-line mode
- Battery mode
- Auto-restart mode
- Bypass mode
- Parallel mode
- ECO mode
- Frequency converter mode

Each operating mode is described below.

On-Line mode

This is the default mode of operation in which the load is supplied via the inverter when the a.c. input and load are within their normal ranges. The battery is trickle charged in this mode.

During fault conditions the UPS automatically switches to either bypass mode or battery mode without interruption of power to the load.

Battery mode

In battery mode the load is supplied from the battery via the inverter, the UPS beeps every 3 s, and the rectifier and charger are turned off. The UPS switches to battery mode when there is no a.c. input or the a.c. input is outside its normal range. On the front panel the Mains LED if off and the Battery LED is on.

When the battery reaches a pre-set low limit, the system gives a low battery voltage alarm signal, the LCD provides a low battery alarm, and the UPS beeps every second. Eventually the UPS shuts down to prevent damage to the batteries.

When the a.c. mains is restored the inverter starts automatically and the UPS reverts to on-line mode. If you turn off the UPS in battery mode it restarts in bypass mode and you must press the INVERTER ON button to start the inverter.

Auto-restart mode

Following an extended a.c. mains failure the battery will become exhausted. When the battery reaches the end of discharge (EOD) voltage the inverter shuts down and no more power is supplied to the load.

By default the UPS remains shut down after EOD. However it can be programmed to automatically restart after a time delay. This is normally done by the commissioning engineer.

Bypass mode

In bypass mode the load is supplied directly from the a.c. mains input and the battery is charged. The UPS switches to bypass mode when any of the following conditions occur:

- An output overload – the unit beeps twice every second, indicating that the load must be reduced to within its normal range as soon as possible. Once the overload is removed the inverter re-starts after a 5 minute delay. If the UPS is overloaded too many times in any one hour it will eventually remain in bypass mode.
- The UPS is too hot – the UPS reverts to on-line mode as soon as the unit temperature returns to normal.
- The UPS fails – a serious fault has occurred within the UPS that must be repaired.
- The UPS inverter is turned off.

In bypass mode the Inverter LED is off and the Bypass LED is on.

Parallel redundancy mode (system expansion)

To achieve a higher capacity and / or increase reliability, the outputs of up to four UPS modules can be programmed to operate in parallel and the built-in parallel controller in each UPS ensures automatic load sharing.

ECO mode

If specified, your UPS may be set to operate in ECO mode instead of on-line mode. In ECO mode the load is supplied via the bypass circuit and not the inverter, allowing the UPS to work at higher efficiency. The battery is trickle charged in this mode. If the a.c. input is lost or goes beyond its normal range the UPS automatically switches to battery mode, however, the transfer speed is slower than on-line mode and may not be suitable for all applications.

Frequency converter mode

The UPS can be programmed to work as a frequency converter to provide either a 50 or 60 HZ a.c. output voltage. In this mode static bypass operation is disabled and the UPS may operate in battery mode.

Switching on the UPS

Note: It is important to switch on your UPS as described below as damage may occur when supplying certain load types.

Caution: When using the UPS for the first time, charge the batteries for at least 8 hours as they may have lost charge during the time between production and installation.

To switch on the UPS:

1. Ensure all UPS breakers are switched off.
2. Switch on the battery breaker.
3. Switch on the distribution breaker.
4. Switch on the UPS input and output breakers. The Bypass LED is now illuminated. You should immediately hear the fans start up

   The LCD should begin to work.

   After a few seconds the Inverter LED should illuminate and the Bypass LED goes out.

   Note: If switching on into a transformer load, ensure the UPS is initially working in bypass mode before switching to on-line mode.

5. If possible apply the load gradually.

Caution: If the UPS input power is provided by a generator it is important to apply the load gradually.

In this state your unit is working correctly and delivering power to the load. There is no need to alter any settings.

Commissioning test procedure

Perform this test once the unit is operating normally.

1. Switch off the mains to simulate a utility failure. The rectifier should turn off and the battery should feed the inverter without interruption. The battery and inverter LED's should be on.
2. Switch on the mains to simulate utility recovery, the rectifier should restart automatically after 10 s and supply the load.

Switching off the UPS

Caution: All power to the load will be removed when you follow this procedure.

To switch off the UPS:

1. Using the front panel switch the unit into bypass mode.
2. Switch off the mains breaker and lock it out. Wait until the screen goes blank, this may take a while.
3. Switch off the battery breaker according to the manufacturer's instructions.

Transferring the load to an EMBS

Transferring to an emergency backup supply (EMBS) is only possible if an external maintenance bypass breaker has been wired into the system.

To transfer to an EMBS while maintaining the load:

1. Switch off the UPS inverter to put the unit into static bypass.
2. Switch on the external maintenance bypass breaker.
3. Switch off the UPS and battery as described above. The UPS is now off.
4. Perform the required maintenance work on the UPS.
5. After the maintenance work is complete, switch on the UPS as described above.
6. Switch off the external maintenance bypass breaker. The inverter should start automatically.

Black(Cold) start procedure

CAUTION!

Follow these procedures to switch on the unit without a good mains supply but batteries are fully charged.

- Turn on the battery switch.

The battery will feed the Auxiliary power board.

- Turn on the Output switch
- Trigger the cold start button of the module as the position 5 of the above drawing.

With the batteries in a normal charged state, the rectifier starts operation, 30s later the inverter starts and the unit operates with the battery LED on.

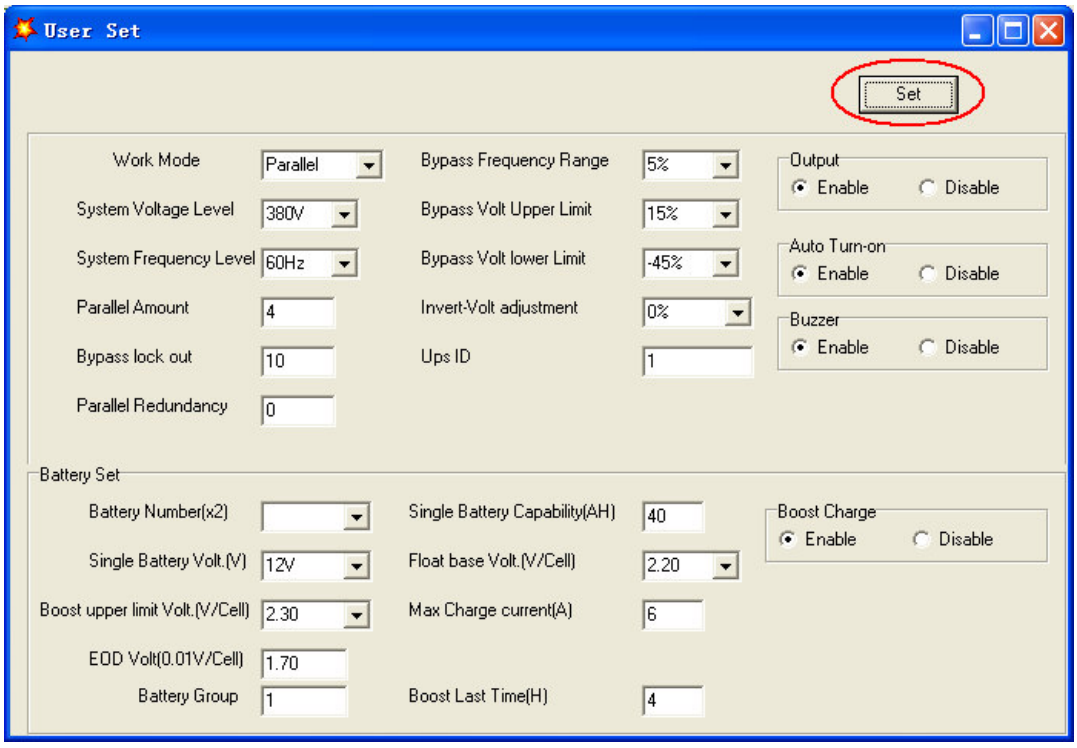
CAUTION!

Wait for approximately 30 seconds after you close the battery switch before you press the black start button.

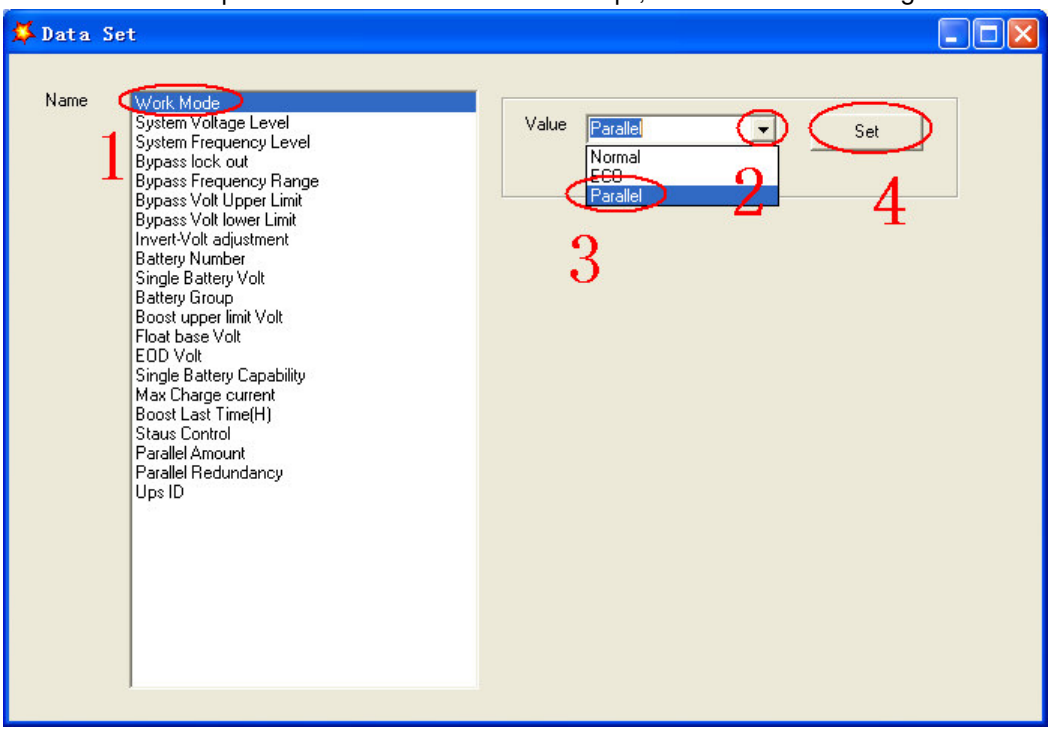
Parallel setting

- Connect the UPS with computer. Power on the UPS.
- Open Muser 4000 software, after connecting with the UPS successfully, click “System”->“User Set”

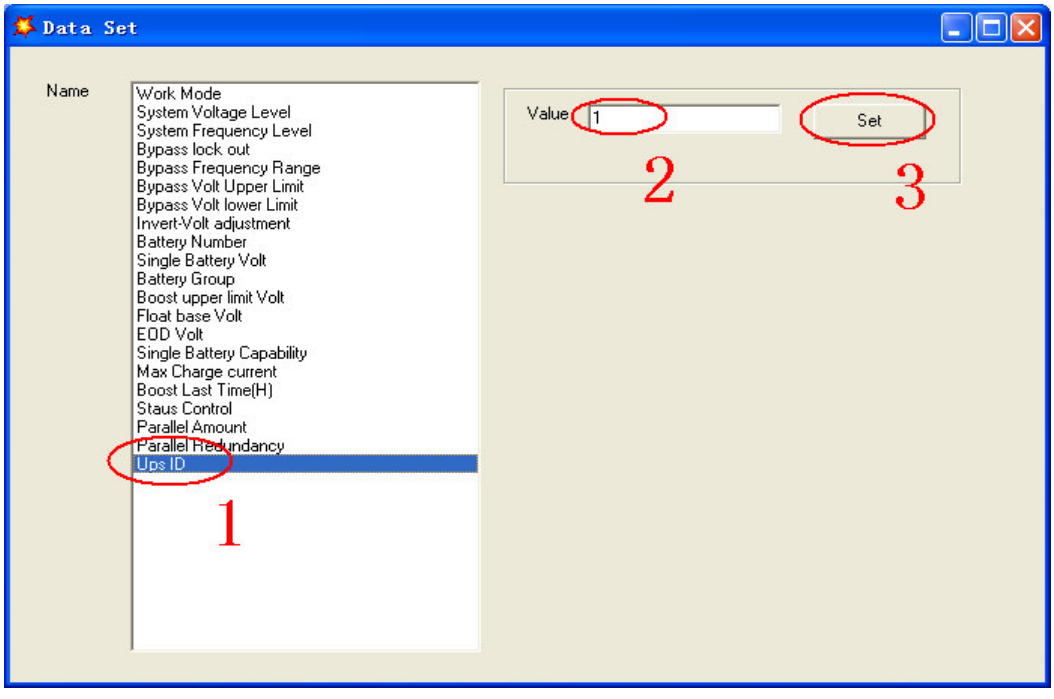
- Click ‘Set” at “User Set” window;



- At the window of “Data Set”, click “Work Mode”,, choose “Parallel” for the value, then click “Set” as shown in below picture. If the UPS sounds a “beep”, that means the setting is correct.



- At the window of “Data Set”, click “Ups ID”, write a value for the parallel UPS ID at the right side, such as “1”, then click “Set” as shown in below picture. If the UPS sounds a “beep”, that means the setting is correct.



After changing the parallel system ID, the connection between Muser4000 and equipment might be interrupted. If it occurs, please re-connect in accordance with the instruction described before.

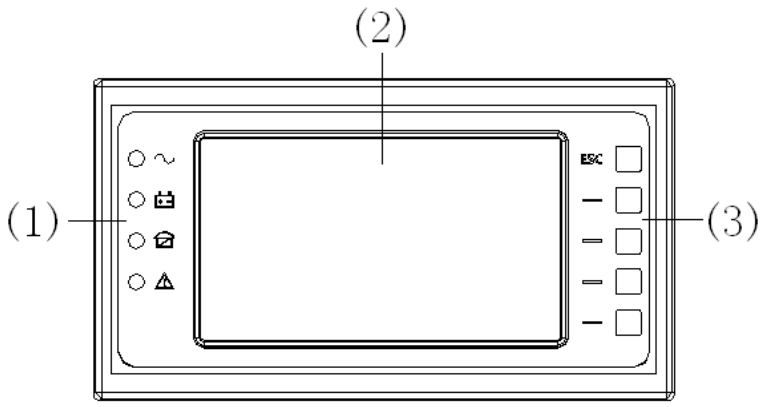
CAUTION !

Parallel cable cannot be connected when setting the parallel parameters.

- After setting the UPS's needed to be paralleled, power off all the UPS's. Connect all the UPS's according to "parallel cable installation", and then power on the UPS's.

The Display

LCD display



LCD control panel introduction

（1）LED（from top to bottom: “mains output”, “bypass output”、“battery output”、“alarm”）

（2）LCD display

（3）Function buttons

Note: The operation will be available when all the above buttons are pressed and kept for 1s.

Introduction

CAUTION!

The display provides more functions than those described in this manual

NOR 08:08:08 13-01	
LCD SELFTESTING……	

LCD SELFTEST

NOR 08:08:08 13-01	
160kVA UPS SELFTEST PLEASE WAIT……	

UPS SELFTEST

NOR 08:08:08 13-01	MAIN
LOAD: 0% PBATT:270v	TURN ON
I/P VOLT:220 220 220v	
O/P VOLT: 0 0 0v	
I/P FREQ:50.0Hz	INQUIRE
O/P FREQ: 0.0Hz	
STATUS:UPS NO ON	SETUP

TURN ON UPS

NOR 08:08:08 13-01	TURN ON
LOAD: 0% PBATT:270v	CONFIRM
I/P VOLT:220 220 220v	
O/P VOLT: 0 0 0v	CANCEL
I/P FREQ:50.0Hz	INQUIRE
O/P FREQ: 0.0Hz	
STATUS:UPS NOT ON	SETUP

INVERTER TURN ON

NOR 08:08:08 13-01	TURN ON
UPS IS TURNING ON	CANCEL
PLEASE WAIT	
■■■■■■■■■■	

INVERTER TURNING ON

NOR 08:08:08 13-01	MAIN
LOAD: 0% PBATT:270v	TURN OFF
I/P VOLT:220 220 220v	
O/P VOLT:220 220 220v	
I/P FREQ:50.0Hz	SELFTEST
O/P FREQ:50.0Hz	
STATUS:MAINS OK	INQUIRE

INVERTER TURN OFF

NOR 08:08:08 13-01	TURN OFF
LOAD: 0% PBATT:270v	TO BPS
I/P VOLT:220 220 220v	
O/P VOLT:220 220 220v	
I/P FREQ:50.0Hz	SELFTEST
O/P FREQ:50.0Hz	
STATUS:MAINS OK	INQUIRE

TURN TO BYPASS

NOR 08:08:08 13-01	TO BPS
LOAD: 0% PBATT:270v	CANCEL
I/P VOLT:220 220 220v	
O/P VOLT:220 220 220v	CONFIRM
I/P FREQ:50.0Hz	INQUIRE
O/P FREQ:50.0Hz	
STATUS:MAINS OK	SETUP

CONFIRM TURN TO BYPASS

NOR 08:08:08 13-01	TO BPS
LOAD: 0% PBATT:270v	
I/P VOLT:220 220 220v	
O/P VOLT:220 220 220v	
I/P FREQ:50.0Hz	INQUIRE
O/P FREQ:50.0Hz	
STATUS:BYPASS MODE	SETUP

BYPASS MODE

NOR 08:08:08 13-01	NO O/P
LOAD: 0% PBATT:270v	
I/P VOLT: 0 0 0v	
O/P VOLT: 0 0 0v	
I/P FREQ: 0.0Hz	INQUIRE
O/P FREQ: 0.0Hz	
STATUS:UPS NOT ON	SETUP

TURNING OFF

NOR 08:08:08 13-01	SELFTEST
LOAD: 0% PBATT:270v	TEST 10s
I/P VOLT:220 220 220v	TEST 10M
O/P VOLT:220 220 220v	TILL LOW
I/P FREQ:50.0Hz	INQUIRE
O/P FREQ:50.0Hz	
STATUS:MAINS OK	

SELFTEST

NOR 08:08:08 13-01	SELFTEST
LOAD: 0% PBATT:270v	CANCEL
I/P VOLT:220 220 220v	
O/P VOLT:220 220 220v	
I/P FREQ:50.0Hz	
O/P FREQ:50.0Hz	
STATUS:UPS TESTING	INQUIRE

SELFTEST----UPS TESTING

NOR 08:08:08 13-01	INQUIRE
LOAD: 0% PBATT:270v	DETAIL
I/P VOLT:220 220 220v	AUDIO
O/P VOLT:220 220 220v	SERVICE
I/P FREQ:50.0Hz	MAINTAIN
O/P FREQ:50.0Hz	
STATUS:MAINS OK	

INQUIRE

NOR 08:08:08 13-01	DETAIL
LOAD: 0% PBATT:270v	OUTPUT
I/P VOLT:220 220 220v	INPUT
O/P VOLT:220 220 220v	BATTERY
I/P FREQ:50.0Hz	LOAD
O/P FREQ:50.0Hz	
STATUS:MAINS OK	

INQUIRE---- DETAIL

NOR 08:08:08 13-01	OUTPUT
ITEM: AN BN CN	INPUT
O/P VOLT:220 220 220v	BATTERY
O/P CURR: 0 0 0A	LOAD
O/P FREQ:50.0Hz	MAIN
STATUS:MAINS OK	

INQUIRE---- OUTPUT

NOR 08:08:08 13-01	INPUT
ITEM: AN BN CN	OUTPUT
I/P VOLT:220 220 220v	BATTERY
I/P CURR: 0 0 0A	LOAD
I/P FREQ:50.0Hz	MAIN
STATUS:MAINS OK	

INQUIRE---- INPUT

NOR 08:08:08 13-01	BATTERY
PBATT VOLT:270v 6A	OUTPUT
NBATT VOLT:270v 6A	INPUT
STATUS:CHARGING	LOAD
CAP:100%	MAIN
REMAINING TIME:100Min	
STATUS:MAINS OK	

INQUIRE----BATTERY

NOR 08:08:08 13-01			LOAD
	kW	kVA	OUTPUT
A:	0.00	0.00	INPUT
B:	0.00	0.00	BATTERY
C:	0.00	0.00	STATIC
STATUS:MAINS OK			

INQUIRE----LOAD

NOR 08:08:08 13-01	AUDIO
LOAD: 0% PBATT:270v	ALARM ON
I/P VOLT:220 220 220v	DETAIL
O/P VOLT:220 220 220v	SERVICE
I/P FREQ:50.0Hz	MAINTAIN
O/P FREQ:50.0Hz	
STATUS:MAINS OK	

INQUIRE ----ALARM OFF

NOR 08:08:08 13-01	AUDIO
LOAD: 0% PBATT:270v	ALARM OFF
I/P VOLT:220 220 220v	DETAIL
O/P VOLT:220 220 220v	SERVICE
I/P FREQ:50.0Hz	MAINTAIN
O/P FREQ:50.0Hz	
STATUS:MAINS OK	

INQUIRE ----ALARM ON

NOR 08:08:08 13-01	SERVICE
MODEL:160kVA UPS VER:01	DETAIL
SERIAL:00000000000000	AUDIO
RELAILER PHONE:	MAINTAIN
	MAIN

INQUIRE----SERVICE

NOR 08:08:08 13-01	MAINTAIN
NOW WARN:0	CURRENT
HISTORY:1	HISTORY
CONVERTER MODE:ON	ADVANCE
O/P FREQ:50.0Hz	OTHER
STATUS: FAULT	

MAINTAIN

NOR 08:08:08 13-01	CURRENT
WARN MODULE:NOT FAULT	
	WARN
	CONTER
STATUS:MAINS OK	OTHER

MAINTAIN----CURRENT INFO.

NOR 08:08:08 13-01	WARN
MODULE WARN CORD	MORE
UPS1----------	
UPS2----------	
UPS3----------	CONTER
UPS4----------	
UPS5----------	OTHER

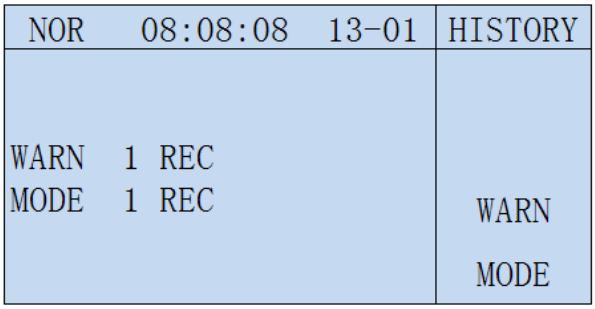
MAINTAIN----WARN

NOR 08:08:08 13-01	CONTER
WARN MODULE:NOT FAULT	RESTART
	AUDIO
	TURN OFF
STATUS:MAINS OK	INQUIRE

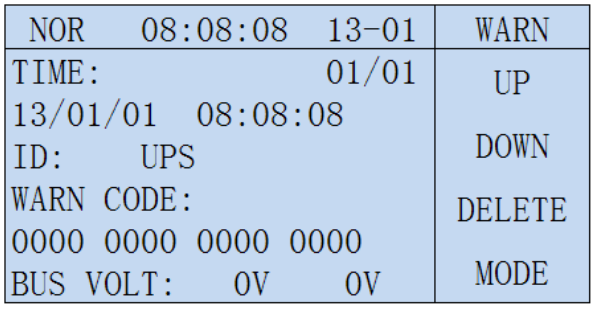
MAINTAIN----CONTER

NOR 08:08:08 13-01	OTHER
Mode Flag0 Bus Inv	UP
0 00000 000 000 000	
0 00000 000 000 000	DOWN
0 00000 000 000 000	
0 00000 000 000 000	
0 00000 000 000 000	MORE

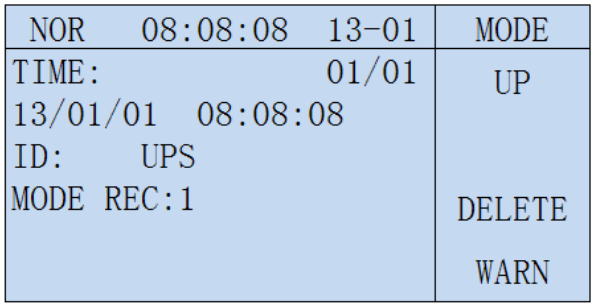
MAINTAIN----OTHER



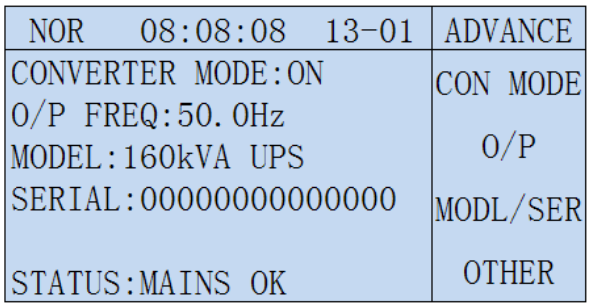
MAINTAIN----HISTORY



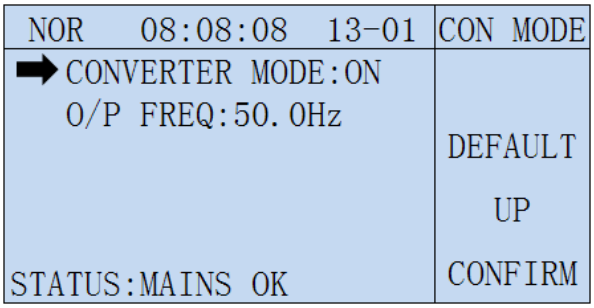
HISTORY----WARN



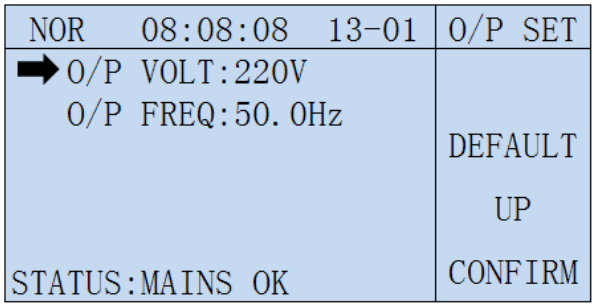
HISTORY----MODE



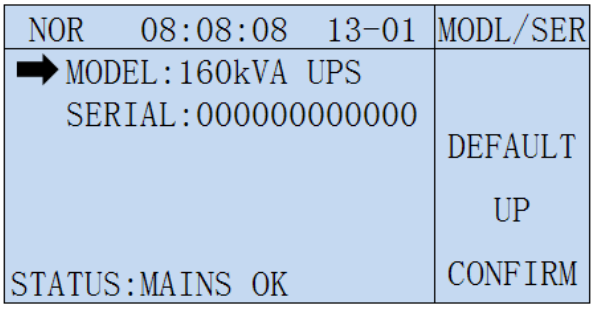
ADVANCE



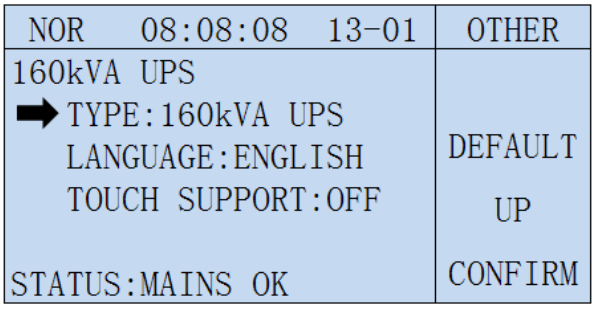
ADVANCE----CONVERTER



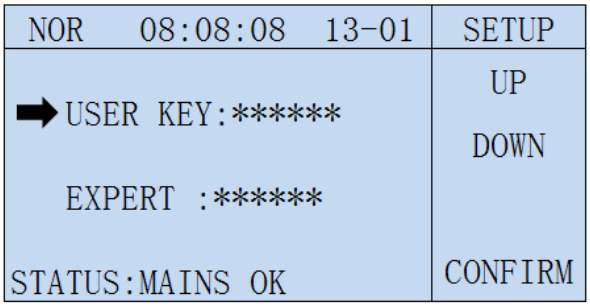
ADVANCE----OUTPUT



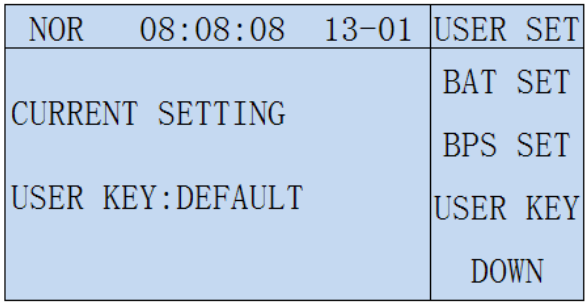
ADVANCE----MODL/SER



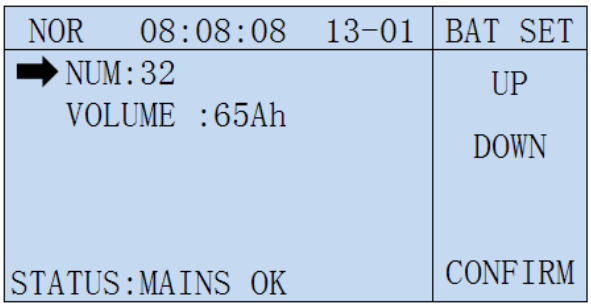
ADVANCE----OTHER



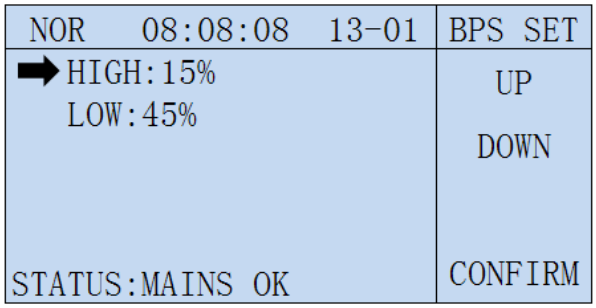
SETUP



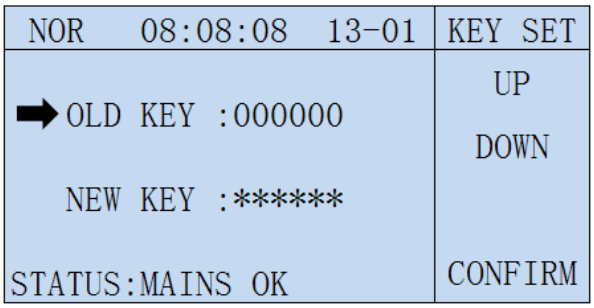
SETUP----USER SET



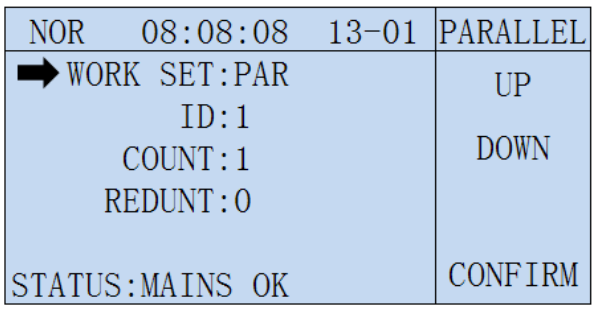
SETUP----BATTERY SET



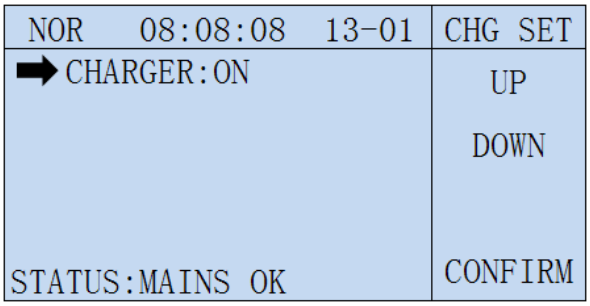
SETUP----BYPASS SET



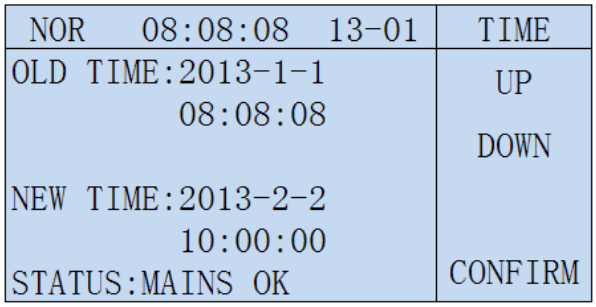
SETUP----USER KEY SET



SETUP----PARALLEL SET



SETUP----CHGRGER SET



SETUP----TIME SET

Display Messages/Troubleshooting

This section lists the event and alarm messages that the UPS might display. The messages are listed in alphabetical order. This section is listed with each alarm message to help you troubleshoot problems.

Display messages

Operational Status and Mode(s)

item	Content Displayed	LED			
		alarm	Bps output	Bat. output	Mains output
1	Initialized	Unlit	Unlit	Unlit	Unlit
2	Standby Mode	Unlit	Unlit	X	Unlit
3	No Output	Unlit	Unlit	Unlit	Unlit
4	Bypass Mode	Unlit	Lit	Unlit	Unlit
5	Utility Mode	Unlit	Unlit	Unlit	Lit
6	Battery Mode	Unlit	Unlit	Lit	Unlit
7	Battery Self-diagnostics	Unlit	Unlit	Lit	Unlit
8	Inverter is starting up	Unlit	X	X	Unlit
9	ECO Mode	Unlit	Lit	Unlit	Lit
10	EPO Mode	Lit	Unlit	X	Unlit
11	Maintenance Bypass Mode	Unlit	Lit	Unlit	Unlit
12	Fault Mode	Lit	X	X	X

Note：“X” shows that it will determined by other conditions.

Alarm Information

Event log	UPS Alarm Warning	Buzzer	LED
1	Rectifier Fault	Beep continuously	Fault LED lit
2	Inverter fault(Including Inverter bridge is shorted)	Beep continuously	Fault LED lit
3	Inverter Thyristor short	Beep continuously	Fault LED lit
4	Inverter Thyristor broken	Beep continuously	Fault LED lit
5	Bypass Thyristor short	Beep continuously	Fault LED lit
6	Bypass Thyristor broken	Beep continuously	Fault LED lit
7	Fuse broken	Beep continuously	Fault LED lit
8	Parallel relay fault	Beep continuously	Fault LED lit
9	Fan fault	Beep continuously	Fault LED lit
10	reserve	Beep continuously	Fault LED lit
11	Auxiliary power fault	Beep continuously	Fault LED lit
12	Initialisation fault	Beep continuously	Fault LED lit
13	P-Battery Charger fault	Beep continuously	Fault LED lit
14	N-Battery Charger fault	Beep continuously	Fault LED lit
15	DC Bus over voltage	Beep continuously	Fault LED lit
16	DC Bus below voltage	Beep continuously	Fault LED lit
17	DC bus unbalance	Beep continuously	Fault LED lit
18	EPO Shutdown	Beep continuously	Fault LED lit
19	Soft start failed	Beep continuously	Fault LED lit
20	Rectifier Over Temperature	Twice per second	Fault LED lit
21	Inverter Over temperature	Twice per second	Fault LED lit
22	reserve	Twice per second	Fault LED lit
23	Battery reverse	Twice per second	Fault LED lit
24	Cable connection error	Twice per second	Fault LED lit
25	CAN comm. Fault	Twice per second	Fault LED lit

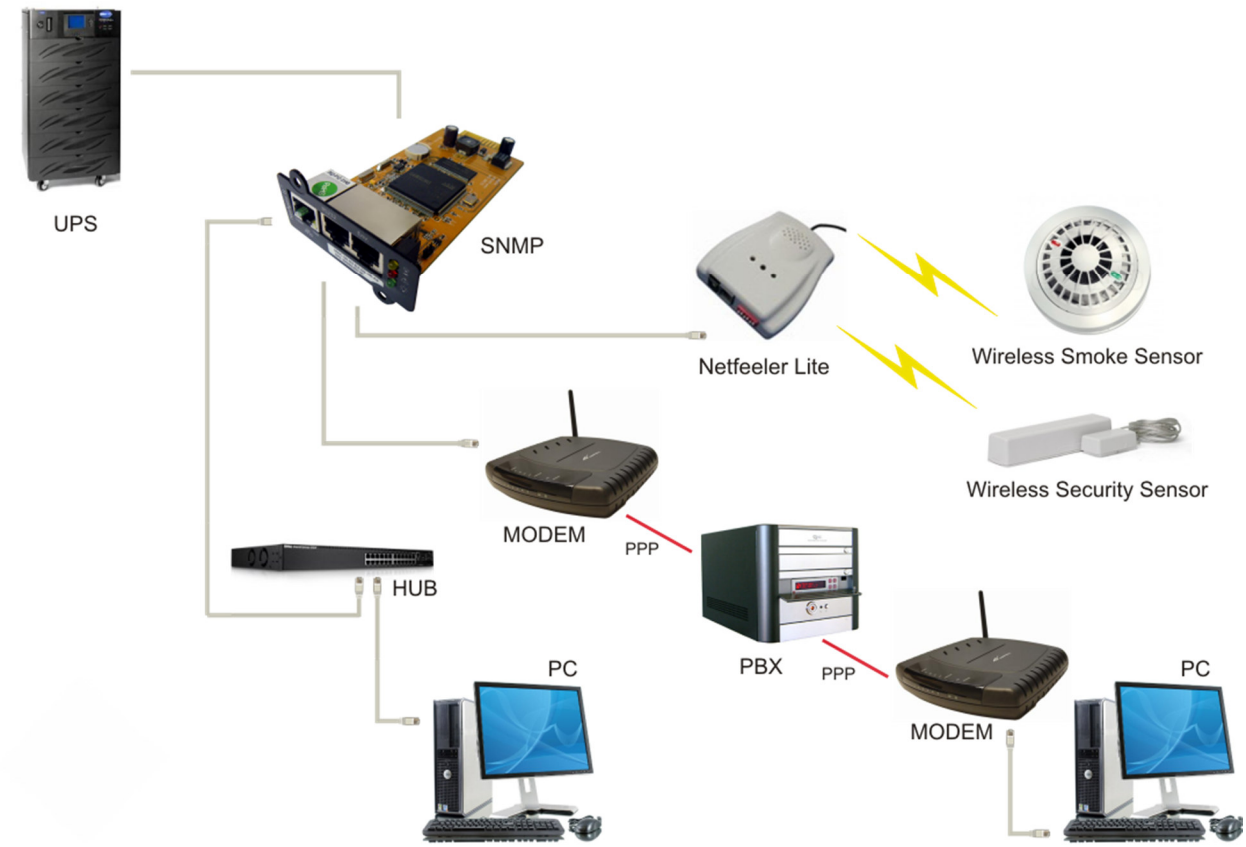
26	Parallel load sharing fault	Twice per second	Fault LED lit
27	Battery over voltage	Once per second	Fault LED flashing
28	Mains Site Wiring Fault	Once per second	Fault LED flashing
29	Bypass Site Wiring Fault	Once per second	Fault LED flashing
30	Output Short-circuit	Once per second	Fault LED flashing
31	Rectifier over current	Once per second	Fault LED flashing
32	Bypass over current	Once per second	BPS LED flashing
33	Overload	Once per second	INV or BPS LED flashing
34	No battery	Once per second	Battery LED flashing
35	Battery under voltage	Once per second	Battery LED flashing
36	Battery low pre-warning	Once per second	Battery LED flashing
37	Internal Communication Error	Once per 2 seconds	Fault LED flashing
38	DC component over limit.	Once per 2 seconds	INV LED flashing
39	Parallel Overload	Once per 2 seconds	INV LED flashing
40	Mains volt. Abnormal	Once per 2 seconds	Battery LED lit
41	Mains freq. abnormal	Once per 2 seconds	Battery LED lit
42	Bypass Not Available		BPS LED flashing
43	Bypass unable to trace		BPS LED flashing
44	Inverter on invalid		
45	Module screws unlocked		

Options

SNMP card with environmental monitor

If your unit is fitted with the optional SNMP card (located in the Intelligent Slot on the front panel), connect it to your computer with a network cable. You can also connect a modem and environment controls as shown below.

For instructions on how to operate the SNMP card, refer to the documentation on the supplied CD.



A topology using network, modem and environmental functions

The SNMP card supports the MEGAtec protocol, allowing you to remotely monitor and manage your UPS system.

NetAgent II-3 Ports supports the Modem Dial-in (PPP) function to enable remote control via the Internet when your network is unavailable.

In addition to the features of a standard NetAgent Mini, NetAgent II has the option to add NetFeelerLite to detect temperature, humidity, smoke and security sensors, thus making NetAgent II a versatile management tool. NetAgent II also supports multiple languages and is setup for web-based auto-detection of language.

Relay card

If your unit has been specified and fitted with the optional relay card (located in the Intelligent Slot on the rear panel) you have access to more advanced monitoring and control functionality via a set of dry contacts and a single opto-coupled input.

Note: If you want to connect to the *Remote shutdown* and the *Operation indication* or other *N/C* signals you will need to connect to the relay card using both connection methods described above.

The relay card includes 6 output ports and one input port. Please refer to the following table for detail.

DB9 interface: Connect to upper control terminal. The definition of the pins is defined as below:

DB9 Pin number	Description	Input/output
1	UPS Failure	Output
2	Summary Alarm	Output
3	Remote Shutdown negative	Input
4	Remote Shutdown positive	Input
5	Common	Common point for all outputs
6	Bypass	Output
7	Battery Low	Output
8	UPS On-line	Output
9	Mains Failure	Output

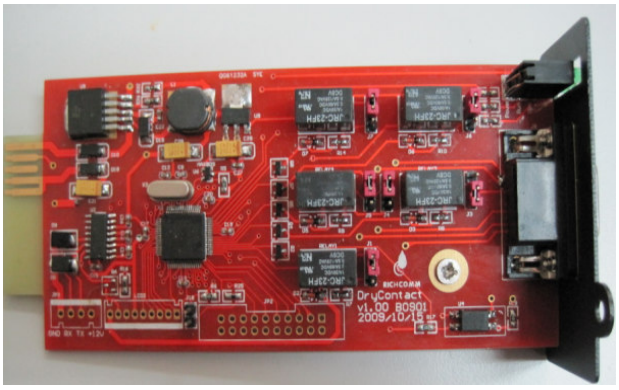


Figure 20：Relay card appearance

Appendix 1 Specifications

Model			E73310B	E73315B	E73320B	E73330B	E73340B
Capacity			10KVA 9KW	15KVA 13.5KW	20KVA 18KW	30KVA 24KW	40kVA 36kW
Input	Phase		3 Phase 4 Wires and Ground				
	Rated Voltage		380/400/415Vac				
	Voltage Range		208~478Vac				
	Frequency Range		40Hz-70Hz				
	Power Factor		≥0.99				
	Current THDi		≤3%(100% nonlinear load)				
	Bypass Voltage Range		Max. voltage: +15%(optional +5%、+10%、+25%) Min. voltage: -45% (optional -20%、-30%) Frequency protection range: ±10%				
	Generator Input		Support				
Output	Phase		3 Phase 4 Wires and Ground				
	Rated Voltage		380/400/415Vac				
	Power Factor		0.9				
	Voltage Regulation		±2%				
	Freq	Utility Mode	±1%、±2%、±4%、±5%、±10% of the rated frequency(optional)				
		Batt Mode	(50/60±0.2%)Hz				
	Crest Factor		3:1				
	THD		≤2% with linear load ≤5% with non-linear load				
	Waveform		Pure Sine wave				
Efficiency			≥95% on-line mode				
Battery	Voltage		384 / 408 / 432 / 456 / 480 VDC				
	Capacity (standard unit)		36 x 12V/38Ah				
	Charge Current(A) (standard unit)		6.0A				10A

Transfer Time			Utility to Battery : 0ms; Utility to bypass: 0ms				
Protection	Over load	AC Mode	Load≤110%: last 60min，≤125%: last 10min，≤150%: last 1min，≥150% shut down UPS immediately。				
		Batt Mode	Load≤110%: last 10min，≤125%: last 1min，≤150%: last 5S，≥150% shut down UPS immediately。				
		Bypass Mode	Breaker 20A	Breaker 32A	Breaker 40A	Breaker 63A	Breaker80
	Short Circuit		Hold Whole System				
	Overheat		Line Mode: Switch to Bypass; Backup Mode: Shut down UPS immediately				
	Battery Low		Alarm and Switch off				
	Self-diagnostics		Upon Power On and Software Control				
	EPO(optional)		Shut down UPS immediately				
	Battery		Advanced Battery Management				
	Noise Suppression		Complies with EN62040-2				
Alarms	Audible & Visual		Line Failure, Battery Low, Overload, System Fault				
Display	Status LED & LCD		Line Mode, Bypass Mode, Battery Low, Battery Bad, Overload & UPS Fault				
	Reading On the LCD		Input Voltage, Input Frequency, Output Voltage, Output Frequency, Load Percentage, Battery Voltage & Inner Temperature				
Communication Interface			RS232，RS485，Dry Contact，Parallel，SNMP card（optional）				
Environment	Operating Temperature		0℃～40℃				
	Storage Temperature		-25℃～55℃				
	Humidity		0～95% non-condensing				
	Altitude		< 1500m				
Other	Unit Dimensions (HxWxD)		1200x600x780				
	Weight (kg)		with batteries:591 without batteries:123	With batteries:594 without batteries:126	With batteries:595 without batteries:127	With batteries:599 without batteries:130	With batteries:601 without batteries:132
Safety Conformance			CE,EN/IEC 62040-2,EN/IEC 62040-1-1				
EMC			IEC/EN62040-2,IEC61000-4-2,IEC61000-4-3,IEC61000-4-4, IEC61000-4-5,IEC61000-4-6,IEC61000-4-8				

Appendix 2 Problems and Solution

Before contacting your distributor, try to solve your problem using the information in the following table. If you need to contact your distributor make sure you have the model number and serial number of your UPS.

Frequently asked questions

Please check these aspects first. If all these aspects are checked without any problem, please consult with local agent right away and provide below information.

（1） Product model name and serial number.

（2） Try to describe the fault with more details, such as LCD display info, LED lights status, etc.

Please read the user manual carefully, it can help using this UPS in the correct way. Here are some FAQ (frequently asked questions) may help you to troubleshoot your problem easily.

No.	Problem	Possible reason	Solution
1	Utility is connected but the UPS cannot be powered ON.	Input power supply is not connected; Input voltage low; The input switch of the module is not switched on .	Measure to see if the UPS input voltage/frequency are within specification.
2	The UPS does not indicate any failure, but output do not have voltage	Output cable does not well connected	Make sure the output cable is well connected.
3	The UPS module cannot transfer to bypass or inverter	Module is not correctly inserted; The left corner screw is not tight. Output breaker is not switched on	Pull out the module and insert again; Tighten the screw; Switch on the output breaker.
4	Utility LED is flashing	Utility voltage exceeds UPS input range.	If the UPS operates in battery mode, please pay attention to the remaining backup time needed for your system.
5	Battery LED is flashing but no charge voltage and current	Battery breaker is not switch on, or batteries are damaged, or battery is incorrectly connected. Battery number and capacity are not set correctly.	Switch on the battery breaker. If batteries are damaged, you need to replace whole group batteries, Connect the battery cables correctly; Go to LCD setting of the battery number and capacity, set the correct data.
6	Buzzer beeps every 0.5 seconds and LCD display “output overload”	UPS load exceeds specification	remove some load
7	Buzzer long beeps, LCD display “output short circuit”	The UPS output is in short circuit	Make sure the load is not in short circuit, and then restart the UPS.

8	The RED LED on the Module is lit	The module is not inserted properly.	Pull out the module and re-insert properly.
9	The UPS only works on bypass mode	The UPS is set to ECO mode	Set the UPS working mode to Single Module type(non-parallel)
10	Cannot black start	Battery switch is not properly closed; Battery fuse broken; Or Battery low	Close the battery switch; Change the fuse; Recharge the battery
11	Buzzer beeps continuously and LCD indicates rectifier fault or output fault	UPS is out of order	Consult with your local agent for repair

Appendix 3 RS232 communication port definition

RS232 serial port

E200 series units are fitted with a standard RS232 serial port, which can be used to:

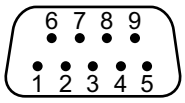
- Monitor the UPS power status
- Monitor the UPS alarm information
- Monitor the UPS running parameters
- Perform a battery test

To enable RS232 control:

1. Connect the UPS to your computer using the supplied RS232 cable.
2. Load the supplied software onto your computer.

Connections between computer and UPS RS232 ports

Computer		UPS
RDX 2	←	TX 3
TDX 3	→	RX 2
GND 5		GND 5



RS232 serial port pin-outs looking at the socket on the UPS

RS232 communication data format

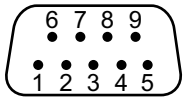
Parameter	Value
Baud rate	2400 bps
Byte length	8bit
End bit	1bit
Parity check	Null

CAUTION!

RS232 & RS485 ports cannot be used at the same time.

Appendix 4 RS485 communication port definition

Definition of RS485 port:



RS485 port pin-outs looking at the socket on the UPS

Connection between the computer's RS485 port and UPS RS485 port.

PC（DB9 Male)	UPS（DB9 female）	Description
Pin 1	Pin 1	485 "-"
Pin 6	Pin 6	485 "+"

Available function of RS485

- Monitor the UPS power status
- Monitor the UPS alarm information
- Monitor the UPS running parameters
- Timing off/on setting

CAUTION!

RS232 & RS485 ports cannot be used at the same time.

Notes

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